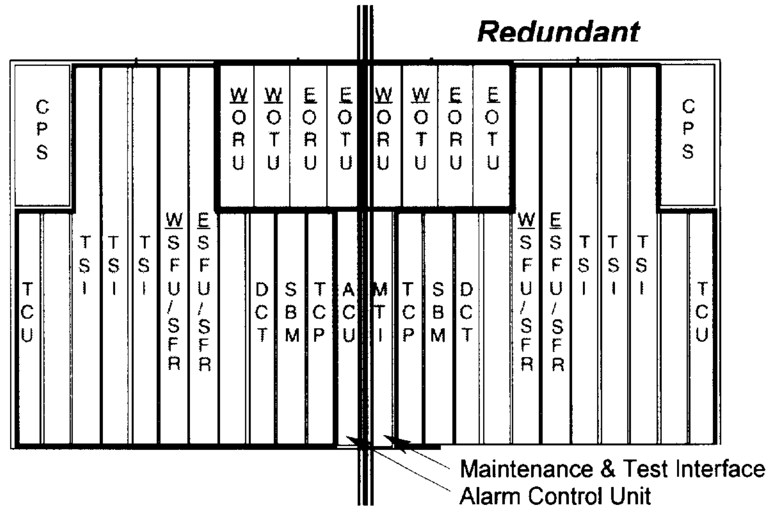
Q. WHAT ASSUMPTIONS DID YOU MAKE WITH RESPECT TO THE HIGH-DENSITY DLC SYSTEM CONCERNING THE EQUIPMENT CARDS THAT WOULD BE INCLUDED IN THE CENTRAL OFFICE TERMINAL THAT WOULD BE DEDICATED TO A REMOTE TERMINAL?

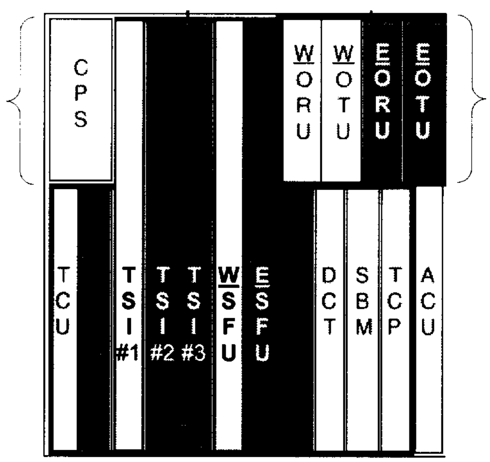
A. The following diagram shows the equipment cards I used in my analysis and the manner in which the manufacturers package them together for sale. In my view, no complaint can be raised that I have assumed a low-quality or low-cost configuration for the system.

Litespan 2000 Central Office Terminal
Common Control Bank
Full Redundancy
(except for ACU & MTI)

Typical Litespan 2000
Common Control Bank



Common Support Group
CPS = Common Control Power Supply
ACU = Alarm Control Unit
MTI = Maintenance & Test Interface



Common Optical Group
ORU = Optical Receiver Unit
OTU = Optical Transmitter Unit
W = West SONET direction
E = Optional East SONET direction
(for bi-directional rings – not modeled)

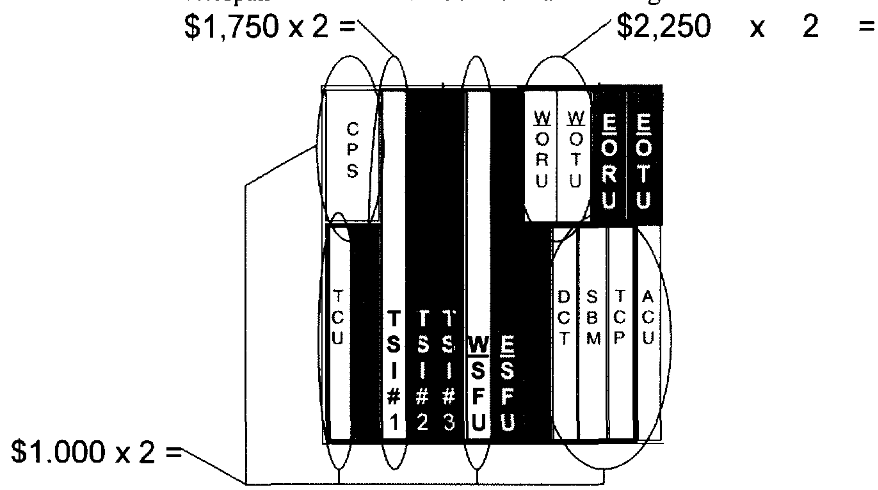
One Half of
Common Control Bank

Common Equipment Group
TCU = Timing Control Unit
TSI #1 = Time Slot Interchanger (OC-1 #1: Initial 672 lines)
(W)SFU = (West direction) SONET Formatter Unit
Optional
TSI #2 = Time Slot Interchanger (OC-1 #2: Incremental Investment for 1344 lines)
TSI #3 = Time Slot Interchanger (OC1 #3): Incremental Investment for 2016 lines)
(E)SFU = (East direction) Optional SONET Formatter Unit (for bi-directional rings – not modeled)

Q. HOW ARE SUCH PACKAGES OF ELECTRONIC CARDS PRICED?

A. Prices for this type of equipment are usually based on sets of cards. The diagram and information that follows is sufficient to support an initial increment of up to 672 lines.

Litespan 2000 Common Control Bank Pricing



Common Control Bank [Fiber Optics Multiplexer] Pricing				
Item	Description	Quantity	Cost	Total Cost
ORU + OTU	SONET Transceivers (Receive + Transmit)	2 pr.	$2,250	$4,500
TSI	Time Slot Interchange (1 per 672 Lines)	2 ea.	$1,750	$3,500
2 ea. SFU 2 ea. TCU 2 ea. TCP 2 ea. SBM 2 ea. DCT 2 ea. CPS 1 ea. ACU 1 ea. MTI	2 ea. SONET [Ring] Formatter Unit 2 ea. Timing Control Unit 2 ea. Terminal Control Processor 2 ea. System Backup Memory 2 ea. Datalink Controller & Tone Generator 2 ea. Common Control Power Supply 1 ea. Alarm Control Unit 1 ea. Maintenance & Test Interface	1 set	$2,000	$2,000
			Total	$10,000

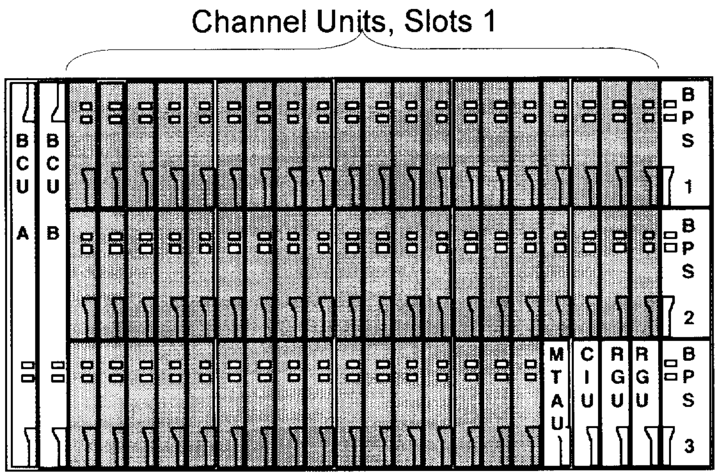
Central Office DLC Equipment				
Item	Description	Quantity	Cost	Total Cost
Matl	Common Control Bank	1 shelf	$10,000	$10,000
Matl	SONET Firmware (rack & multiplexer shelf)	1 shelf	$7,000	$7,000
Matl	Channel Bank Assembly w/ BCUs & BPSs	1 set	$500	$500
Matl	Digital Cross Connection Frame & Cabling	1 shelf	$800	$800
Matl	Fiber Splice Panel	1 shelf	$200	$200
Labor	Engineering hours	12.0 hrs	$55	$660
Labor	Place Frames & Racks	3.0 hrs.	$55	165
Labor	Connect Alarms, CO Timing & Power	1.0 hr.	$55	$55
Labor	Splice DSX Metallic Cable	1.0 hr.	$55	$55
Labor	Place DSX Cross Connections	0.8 hr.	$55	$45
Labor	Place Common Cards	0.5 hr.	$55	$55
Labor	Place Fiber Splice Panel & Splice Fibers	5.5 hrs.	$55	$300
Labor	Turn Up & Test System	3.0 hrs.	$55	$165
			Total	$20,000

Q. WHAT ASSUMPTIONS DID YOU MAKE WITH RESPECT TO THE HIGH-DENSITY SYSTEM CONCERNING THE CHANNEL BANKS NEEDED AT THE REMOTE TERMINAL IN THE FIELD?

A. I assumed that channel banks at the remote terminal in the field would convert the digital signals to analog signals to be routed to a SAI and out into the copper distribution cable network. The diagram and information that follows is sufficient to support an initial increment of up to 672 lines.

Litespan 2000 Remote Terminal

Channel Bank Assembly & Channel Bank Common Cards



<u>Channel Bank Commons ***$833***</u>
BCU = Bank Control Unit
BPS = Bank Power Supply
MTAU = Metallic Test Unit
RGU = Ringing Generator Unit
CIU = Communications Interface Unit

Remote Terminal DLC Equipment				
Item	Description	Quantity	Cost	Total Cost
Matl	Common Control Bank (same as C.O.)	1 shelf	$10,000	$10,000
Matl	Cabinet / Housing, equipped at factory	1 ea.	$27,500	$27,500
Matl	Channel Bank Assembly	3 shelves	$1,333	$4,000
Matl	Channel Bank Commons	3 sets	$833	$2,500
Matl	Power Pedestal	1 set	$500	$500
Matl	Fiber Splice Panel	1 shelf	$200	$200
Labor	Engineering	32 hrs.	$55	$1,760
Labor	Construct Pad & Site	1 site	$2,000	$2,000
Labor	Place Power Pedestal & Hook Up Power	1 site	$500	$500
Labor	Place Cabinet	4 hrs.	$55	$220
Labor	Install Batteries & Turn Up Power	2 hrs.	$55	$110
Labor	Place Fiber Patch Panel & Splice Fibers	5.5 hrs.	$55	$300
Labor	Copper Splicing	4 hrs.	$55	$220
Labor	Install Common Cards	0.5 hrs.	$55	$25
Labor	Turn Up & Test System	3 hrs.	$55	$165
			Total	$50,000

Q. WHAT ASSUMPTIONS DID YOU MAKE WITH RESPECT TO THE HIGH-DENSITY SYSTEM CONCERNING THE MANNER IN WHICH INCREMENTAL EQUIPMENT ADDITIONS WOULD BE ADDED TO A 672-LINE SYSTEM TO INCREASE ITS CAPACITY TO 1344 LINES, AND THEN AGAIN TO 2016 LINES?

A. In the central office, incremental additions to increase a 672-line system to a capacity of 1344 lines, or then again to 2016 lines would require additional DSX-1 cross connect terminations, cabling, engineering labor, and installation labor in the central office to bring additional DS-1s to the switch. Most of the incremental investment required for this type of capacity expansion is in the Remote Terminal for a larger capacity cabinet, an additional Time Slot Interchanger, a Channel Bank Assembly, Channel Bank Assembly Commons, additional engineering, and installation labor. Each 672-line capacity increment requires costs detailed as follows:

High Density GR-303 DLC 672 Line Increment			
Central Office Terminal Common Equipment		Central Office Terminal Labor	
DSX-1 & Cabling	$800	Splice DSX Metallic Cable	$55 (1.0 hr.)
		Place DSX Cross Connections	$28 (0.5 hrs.)
		Turn Up & Test System	$110 (2.0 hrs.)
Subtotal	$800	Subtotal	$200
Remote Terminal Common Equipment		Remote Terminal Labor	
Cabinet	$7,300	Copper Splicing 2 hrs. (672 pairs @ 400/hr.)	$110 (2.0 hrs.)
Time Slot Interchanger	$3,500	Turn Up & Test System	$110 (2.0 hrs.)
Channel Bank Assemblies	$4,000		
Channel Bank Assembly Commons	$2,500		
Subtotal	$17,300	Subtotal	$200
Total = $18,500			

Adding this $18,500 to the $70,000 figure previously developed for a 672 line DLC system yields the $88,500 I propose as an input for a 1,344 line DLC system on line 3 of the grid on page 14 above. Similarly, adding an additional

$18,500 to the $88,500 developed for a 1,344-line DLC system yields the $107,000 I propose as an input for a 2,016-line DLC system on line 1 of the grid on page 14 above.

Q. DID YOU ASSUME ANY OTHER COSTS FOR THE HIGH-DENSITY SYSTEM?

A. Yes, as noted above, I assumed a fiber optic patch panel at a price of $1,000. A fiber patch panel allows the interface of the fiber optic cable driving the system with the optronics of the digital loop carrier.

Q. YOU HAVE DISCUSSED THE COSTS YOU ASSUMED FOR HIGH-DENSITY DLC SYSTEMS. CAN YOU SUPPLY A CORRESPONDING DETAILED BREAKDOWN OF THE COSTS YOU ASSUMED FOR A LOW DENSITY DLC SYSTEM?

A. Yes. The following information is appropriate for a small 120-line Integrated DLC system without line cards. In the case of low-density GR-303 IDLC systems, it is important to note that one central office Host Digital Terminal ("HDT") provides services for a number of small Remote Terminals. This is appropriate engineering design of such systems.

Low Density GR-303 DLC			
Central Office Terminal Common Equipment		**Central Office Terminal Labor**	
SONET Firmware	$3,000	Engineering	$660 (12.0 hrs.)
SONET Transceivers*	See Below*	Place Frames & Racks	$165 (3.0 hrs.)
Common COT Plug Ins	$1,200	Splice DSX Metallic Cable	$55 (1.0 hr.)
DSX-1 & Cabling	$800	Place DSX Cross Connections	$28 (0.5 hrs.)
		Connect Alarms, CO Timing & Power	$55 (1.0 hr.)
		Place Common Plug Ins (21 ea.)	$28 (0.5 hrs.)
		Turn Up & Test System	$165 (3.0 hrs.)
Subtotal	$5,000	Subtotal	$1,200
Allocation of COT Host Digital Terminal Investment per 120 RT 120 lines / 672 lines per COT HDT = 17.86% x 75% assumed HDT fill = 23.81%	.2381	Allocation of COT Host Digital Terminal Investment per 120 RT 120 lines / 672 lines per COT HDT = 17.86% x 75% assumed HDT fill = 23.81%	.2381
Subtotal	$1,200	Subtotal	$300
SONET Transceivers*	$2,000*		
Central Office Terminal Common Equipment Subtotal	$3,200	Central Office Terminal Labor Subtotal	$300
Remote Terminal Common Equipment		**Remote Terminal Labor**	
Cabinet w/ Channel Bank Assembly	$5,500	Engineering	$990 (18.0 hrs.)
SONET Transceivers	$2,000	Place Cabinet	$165 (3.0 hrs.)
Multiplexer and Channel Bank Assembly Commons	$3,500	Copper Splicing (2 hrs. + 120 pairs @ 400/hr.)	$127 (2.3 hrs.)
		Place Batteries & Turn Up Power	$55 (1 hr.)
		Turn Up & Test System	$165 (3.0 hrs.)
Remote Terminal Common Equipment Subtotal	$11,000	Remote Terminal Labor Subtotal	$1,500
Total = $16,000			

When the $1,000 cost of a fiber optic patch panel (discussed at page 30 above) and the $1,300 cost of site preparation (discussed at pages 33 and 36 below) are added to the $16,000 figure calculated above, the sum is the $18,300 common costs input I propose for the low-density DLC systems shown on lines 7, 9 and 11 of the grid on page 14.

Q. WHAT KIND OF LINE CARDS DID YOU ASSUME WOULD BE USED FOR SMALL DLC REMOTE TERMINALS IN THE LOW-DENSITY SYSTEMS?

A. I assumed extended range line cards would be used for small remotes, because these types of systems are frequently used in rural areas with longer distribution loops.

Q. DID YOU ASSUME ANY OTHER COSTS WITH RESPECT TO THE LOW-DENSITY SYSTEM?

A. Yes, I assumed the need for a fiber optic patch panel at a price of $1,000. A fiber patch panel allows the interface of the fiber optics cable driving the system with the optronics of the digital loop carrier.

Q. DOES THE SYNTHESIS MODEL INCLUDE A SEPARATE INPUT LINE ITEM FOR THE FIBER OPTIC PATCH PANELS ASSUMED IN THE HIGH DENSITY AND LOW DENSITY DLC SYSTEMS?

A. No. Since a fiber patch panel is an integral part of a fiber optic DLC system, I can only assume that its cost must be captured in the FCC inputs for the common control assembly. As a result, I have included my $1,000 cost for the fiber optic patch panel in my DLC common equipment cost figures set forth at lines 1, 3, 5, 7, 9, 11 and 13 of the grid on page 14 above.

Q. BESIDES THE LARGE DIFFERENCE BETWEEN THE COMMON EQUIPMENT COSTS YOU ESTIMATE TO CONSTRUCT A HIGH-DENSITY AND LOW-DENSITY DLC SYSTEM AND THE COMMON EQUIPMENT COSTS REPRESENTED BY THE FCC INPUTS, IS THERE ANY OTHER EVIDENCE THAT LEADS YOU TO BELIEVE THAT THE FCC INPUTS IMPROPERLY INCLUDE LINE CARD COSTS?

A. Yes. If I use my common equipment cost inputs and add to them the costs of line cards assuming a 50% line card fill, the total approximates the FCC inputs for common equipment costs alone. These calculations are shown below.

DLC Common Equipment + Line Cards			
	Recommended Common Equipment inputs	FCC Common Equipment inputs	Recommended Common Equipment inputs with 50% line cards
2016 Line DLC System	$107,000	$163,617.43	$185,120
1344 Line DLC System	$88,500	$118,224.92	$140,580
672 Line DLC System	$70,000	$108,443.38	$96,040
96/120 Line DLC System	$18,300	23,848.20	$24,300

Note: All costs include the central office equipment, remote terminal equipment, remote site preparation, and fiber patch panels.

Q. DOES THE FCC'S INPUT VALUE FOR SITE PREPARATION OVERSTATE COSTS FOR BOTH HIGH-DENSITY AND LOW-DENSITY SYSTEMS?

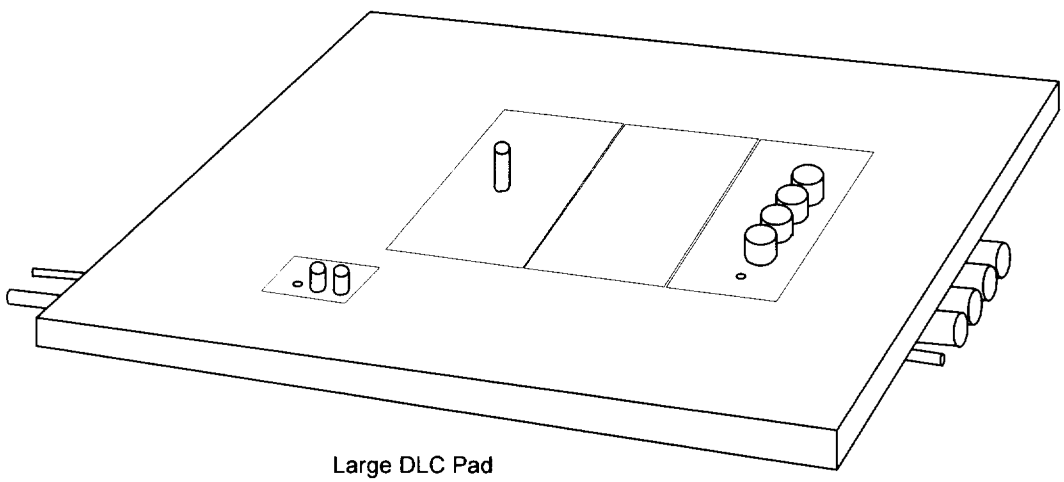
A. The FCC input on line 15 of the grid relating to site preparation sets forth an estimated cost of $11,000. The value of this input should be modified because it overestimates site preparation costs for high-density and low-density DLC systems. Based on my experience and knowledge of the costs involved, I estimate the cost of site preparation for high-density systems to be $3,000, and for low-density systems to be $1,300. As the grid set forth at page 14 reflects, the Synthesis Model has a separate line item for site preparation. My site preparation cost estimates do not appear as a separate line item but are included in the common equipment cost figures appearing at lines 1, 3, 5, 7, 9, 11 and 13 of the grid.

Q. HOW DIFFICULT IS SITE PREPARATION FOR A HIGH-DENSITY SYSTEM?

A. It is not difficult in the least. For a high-density system, site preparation involves primarily the placement of a concrete slab in the ground and installation of the remote terminal equipment.

Q. HOW COMPLICATED IS THE CONCRETE SITE PAD FOR A LARGE DLC REMOTE TERMINAL SYSTEM?

A. Not complicated at all. The largest 2016-line DLC remote terminal site amounts to little more than a 15-foot by 19-foot concrete 'patio' slab, as shown on this basic diagram:



Large DLC Pad

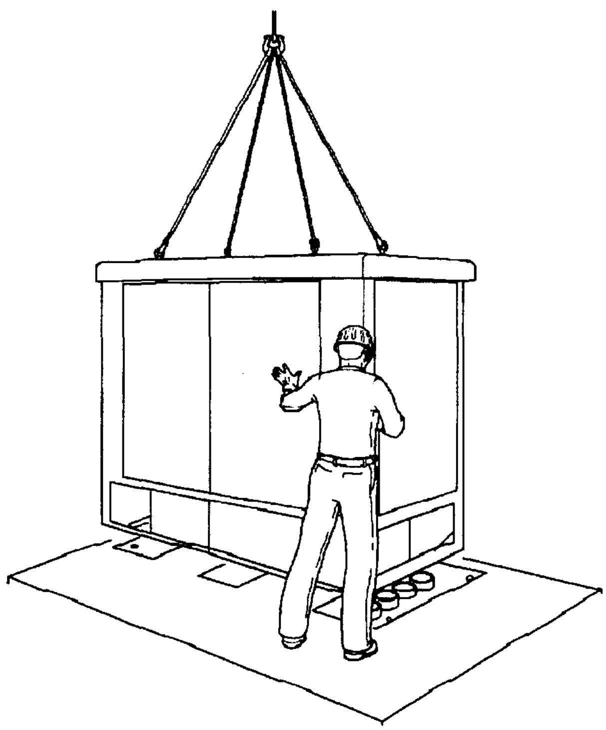
Q. HOW DIFFICULT IS THE REMOTE TERMINAL EQUIPMENT INSTALLATION PROCEDURE?

A. This equipment is most efficiently assembled and tested in the factory by the manufacturer. This improves quality control and avoids costly on-site assembly by highly paid technicians who should be utilized for tasks better suited to their skills. The information below includes excerpts from typical practices.

Litespan 2000 Remote Terminal Cabinet Installation

Installation of a large DLC Remote Terminal is greatly simplified because the cabinet and its components are preassembled and tested at the factory. In fact, DSC, now Alcatel, states in its documentation,

> "The Litespan ... cabinet is a fully self-contained remote terminal (RT) containing Litespan-2000 channel banks and auxiliary equipment to support up to 672 POTS lines, or up to 50 DS1 or T1 lines and an additional 472 POTS lines. It is completely assembled and tested at the factory. Once the equipment is on site and bolted to its mounting pad, the only assembly required consists of connecting local power, connecting drop facilities, connecting optical fiber facilities, installing the back-up batteries, and plugging the circuit packs into their assigned locations in the racks."

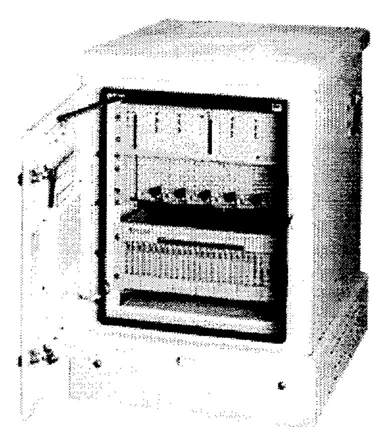


> "The cabinet is prewired at the factory for DC bulk power distribution, environmental alarm reporting, temperature control, and lightning protection.

Ringing power is provided by Ring Generator Units (RGUs) installed in the Litespan channel banks [as opposed to a bulk ringing generator unit]. The cabinet is also provisioned for emergency battery backup and has connections for remote testing facilities."[13]

Q. HOW COMPLEX IS THE SITE PREPARATION FOR A SMALL DLC CABINET?

A. Site preparation for a small DLC cabinet is not complex. Whereas we have used the Alcatel Litespan 2000 IDLC system as typical of a cost-effective large system, a popular small system, manufactured by Advanced Fibre Communications ("AFC"), was used for our small IDLC model. This small cabinet is provided, as the manufacturer states, in "Pad, pole, H-frame, or wall mounting options."[14] Such a system has a very small 'footprint', or can even be mounted on a short 'stub pole'.



Small DLC RT

[13] DSC Practice, LSC2010RT Cabinet, OSP640-257-200, Issue No. 2 (Dec. 1994), ¶¶ 1.03, 1.04.

[14] *See* AFC's website at http://www.fibre.com.

2. Line Fill

Q. WHAT IS THE FCC INPUT FOR LINE FILL IN THE SYNTHESIS MODEL?

A. 80%.

Q. WHAT DOES THIS INPUT REPRESENT?

A. It represents utilization of the line cards associated with a digital loop carrier system.

Q. DO YOU RECOMMEND THAT THIS INPUT BE MODIFIED?

A. Yes, I recommend that it be revised to 90%.

Q. WHAT IS THE BASIS FOR YOUR RECOMMENDATION?

A. The utilization factor, or measure of plant capacity assigned for service, is predicated on the time required to relieve/augment the plant with spare capacity. Conceptually, it could be considered "just in time supply" of parts/materials in a manufacturing process. Excess inventory seriously erodes profit potential and is costly. Similarly, outside plant facilities that lie fallow are costly non-revenue producing assets. The ideal situation would call for a plant addition just as the existing plant reaches exhaust, *i.e.*, has completely used its capacity.

I recommend a 90 percent utilization rate for DLC line cards since sufficient spare capacity exists to permit the timely relief of the route. Unlike copper cables that may take weeks or months to relieve by constructing additional facilities, DLC systems are typically designed to serve a specific geographic area from the start but are then only populated with enough channel cards to serve the known demand plus some modicum of spare capacity (6 months of growth). Thus, additional capacity can be installed any time a technician is in the feeder route by plugging channel cards into the0 pre-existing hardware. Therefore the DLC channel card can be used to expand facility capacity in minutes, not weeks, and at \$310 to \$600 per channel card it is a very expensive, highly portable part of the network – one that should not suffer from poor inventory management.[15] This higher utilization rate is one of the advantages typically claimed by telephone companies in deploying fiber fed DLC feeder rather than copper feeder cable. In addition, the typical guideline in telephone companies is that planned DLC line card deployment, even if done on a programmed basis, should provide for no more than 6 months growth. As an example, if a Distribution Area was initially equipped for 100 lines of known service demand, and an estimated 5% per year growth is forecasted, the practice would permit addressing 6 months growth or 2.5% of the 100 lines. This would translate into 2.5 lines or placing one additional line card (since a line card can handle up to 4 POTS lines) for growth. To calculate the line fill, the 100 lines working would be divided by the 104 lines available or 96% fill. Therefore a 90 percent utilization rate for DLC line cards is very reasonable.

15 The \$310 channel card serves 4 lines, yielding the \$77.50 per line card input quoted in lines 2, 4 and 6 of the grid on page 12 above. The \$600 channel card serves 6 lines, yielding the \$100 per line card input quoted in lines 8, 10, 12 and 14 of the grid on page 12 above.

3. Structure Mix

Q. FOR DISTRIBUTION CABLE, HOW DID YOU DETERMINE THE APPROPRIATE PERCENTAGE OF AERIAL, BURIED AND UNDERGROUND PLANT?

A. Aerial outside plant consists of wires/cable strung on poles, buried outside plant consists of wires/cable placed in underground trenches without any additional structure (direct soil contact), and underground plant refers to some sort of conduit that has been placed underground and the wires/cable run through that conduit.

From experience, I know that it is reasonable to expect ***distribution*** cable to consist primarily of aerial and buried structure; very little underground distribution cable exists, except for a small amount in higher density zones. As will be discussed later, aerial, buried and underground structure percentages for feeder cable will reflect a significantly different breakdown – for example, much more underground structure for feeder cable.

I therefore used the data supplied by Verizon to the FCC, as reflected in its ARMIS report, to determine the percentage breakdown between aerial and buried distribution cable. That data indicates a sheath-kilometer ratio of 35% aerial and 65% buried.

FCC ARMIS Data for Verizon-Virginia (sheath km)						
Year	Aerial	Intra-Bldg	Total Aerial		Buried	
1991	29,587	2,462	32,049	38.6%	51,076	61.4%
1992	29,265	2,467	31,732	38.3%	51,131	61.7%
1993	29,032	2,110	31,142	37.7%	51,551	62.3%
1994	29,027	1,429	30,456	36.8%	52,342	63.2%
1995	28,950	1,463	30,413	36.2%	53,611	63.8%
1996	28,901	1,452	30,353	36.2%	53,569	63.8%
1997	28,926	1,445	30,371	35.8%	54,465	64.2%
1998	28,945	1,440	30,385	35.5%	55,279	64.5%
1999	29,122	1,431	30,553	35.2%	56,306	64.8%
2000	29,083	1,542	30,625	34.9%	57,162	65.1%

Using that basis for the lower density zones, and reserving some underground cable structure for the higher density zones, the following structure percentages for copper distribution cable were developed.

Distribution Cable Structure Type				
Density	Aerial		Buried	Underground
(lines/sq. mi.)	Pole line	Intra-Bldg		
0-53	35%		64%	1%
5-100	35%		64%	1%
100-200	35%		64%	1%
200-650	35%		64%	1%
650-850	35%		64%	1%
850-2,550	35%		64%	1%
2,550-5,000	35%		60%	5%
5,000-10,000	25%	35%	35%	5%
10,000+	20%	65%	5%	10%

Q. FOR FEEDER CABLE, HOW DID YOU DETERMINE THE APPROPRIATE PERCENTAGE OF AERIAL, BURIED AND UNDERGROUND PLANT?

A. Based on my experience, I know that it is reasonable to expect a small amount of underground ***feeder*** cable in lower density zones and a very high percentage of underground feeder cable, and associated high-cost structures, in higher density zones. For example, in downtown Richmond, underground feeder cable would be placed between central offices and basements of buildings (distribution cable would consist of building riser cables). I performed a structure percentage analysis similar to that performed for distribution cable, using the data supplied by Verizon to the FCC, as reflected in the ARMIS report.

FCC ARMIS Data for Verizon-Virginia (metallic sheath km)						
Year	Aerial		Buried		Underground	
1991	29,587	33.4%	51,076	57.6%	7,988	9.0%
1992	29,265	33.3%	51,131	58.2%	7,383	8.4%
1993	29,032	33.0%	51,551	58.7%	7,276	8.3%
1994	29,027	32.7%	52,342	59.0%	7,316	8.2%
1995	28,950	32.2%	53,611	59.7%	7,272	8.1%
1996	28,901	32.2%	53,569	59.7%	7,324	8.2%
1997	28,926	31.9%	54,465	60.0%	7,363	8.1%
1998	28,945	31.6%	55,279	60.3%	7,390	8.1%
1999	29,122	31.4%	56,306	60.7%	7,409	8.0%
2000	29,083	31.0%	57,162	61.0%	7,532	8.0%

After reviewing the ARMIS data, I believe that the following values for copper feeder cable structure percentages by density zone are appropriate, based on my experiences throughout Verizon's territories.

Copper Feeder Cable Structure Type			
Density	Aerial	Buried	Underground
0-5	35%	60%	5%
5-100	35%	60%	5%
100-200	35%	60%	5%
200-650	35%	60%	5%
650-850	35%	60%	5%
850-2,550	35%	60%	5%
2,550-5,000	35%	45%	20%
5,000-10,000	25%	35%	40%
10,000+	25%	5%	70%

A similar analysis for fiber cable is as follows:

FCC ARMIS Data for Verizon-Virginia (fiber sheath km)						
Year	Aerial		Buried		Underground	
1991	2,015	31.1%	1,530	23.6%	2,932	45.3%
1992	2,507	32.6%	1,764	22.9%	3,418	44.5%
1993	3,083	33.3%	2,132	23.0%	4,054	43.7%
1994	3,629	33.9%	2,396	22.4%	4,670	43.7%
1995	4,004	34.4%	2,546	21.9%	5,090	43.7%
1996	4,384	35.2%	2,739	22.0%	5,349	42.9%
1997	4,781	36.2%	2,921	22.1%	5,502	41.7%
1998	5,137	36.4%	3,222	22.8%	5,742	40.7%
1999	5,515	36.6%	3,524	23.4%	6,049	40.1%
2000	5,839	36.3%	3,878	24.1%	6,357	39.5%

Fiber Feeder Cable Structure Type			
Density	Aerial	Buried	Underground
0-5	55%	40%	5%
5-100	55%	40%	5%
100-200	55%	40%	5%
200-650	55%	40%	5%
650-850	55%	40%	5%
850-2,550	55%	40%	5%
2,550-5,000	45%	35%	20%
5,000-10,000	35%	25%	40%
10,000+	25%	5%	70%

Q. THE STRUCTURE MIX VALUES SET FORTH ABOVE ARE NOT CONTAINED IN THE SYNTHESIS MODEL. WHY ARE YOU RECOMMENDING THAT THE STRUCTURE MIX DEFAULT INPUTS BE MODIFIED IN THE SYNTHESIS MODEL?

A. Many of the default input values for structure mix do not comport with generally accepted structure construction practice for the density zones reported and do not reflect forward looking, efficient pricing.

Q. BRIEFLY EXPLAIN THE ROLE ENVIRONMENT PLAYS IN THE SELECTION OF STRUCTURE CONSTRUCTION?

A. Those familiar with Outside Plant understand that the choice of support structure is predicated on a number of factors that influence cost. Among these factors, environment plays a pivotal role. For example, dense urban environments consist largely of buildings and pavement making cable trenching operations impractical, but underground conduit/manholes are a reasonable alternative. By way of contrast, rural environments present ample opportunity to trench and/or construct pole line structure cost effectively. Familiarity with the Outside Plant cable design requirements, *e.g.*, feeder, distribution cable, coupled with support structure alternatives for the density zones included in the model, would dictate that modifications be made to the default input values.

4. Fiber Investment, Fiber Cable

Q. WHAT IS THE FCC DEFAULT INPUT VALUE ASSOCIATED WITH INTEROFFICE TRANSPORT FIBER CABLE COST?

A. The Synthesis Model default value for interoffice transport fiber cable is $3.50 per foot.

Q. WHAT COST DOES THIS INPUT REPRESENT?

A. The model uses this cost to represent the installed cost of fiber cable used to satisfy the interoffice facilities. These facilities typically carry traffic between Central Offices as opposed to loop cable that carries traffic between the Central Office and the subscriber.

Q. DO YOU RECOMMEND THAT THE VALUE OF THIS INPUT BE CHANGED?

A. Yes, I recommend that the value of the input be revised to $1.80 per foot.

Q. WHY DO YOU RECOMMEND THIS CHANGE?

A. The value of the revised input ($1.80) is derived from the weighted average of fiber cable contained in the loop module. The cost associated with the facility should not be dependent upon its purpose in the network (loop vs. interoffice) but rather be consistent with costs developed in the loop module. For this reason, the fiber cable cost associated with a 24 fiber cable in the second density zone, weighted to reflect the structure mix was calculated to derive the value of $1.80. This may be stated as: underground fiber cost (underground %) + buried fiber cost (buried %) + Aerial fiber cost (Aerial %) = $1.80.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

I, Joseph P. Riolo hereby swear and affirm that the foregoing direct testimony was prepared by me or under my direct supervision or control and is true and accurate to the best of my knowledge and belief.

Signed: Joseph P. Riolo

Victoria L. Damone
Witness

State NEW YORK
County NASSAU

I, ROBERT N. TABOR do hereby swear and affirm that JOSEPH P. RIOLO appeared before me this 18th day of July, 2001.

Signed:

Robert N Tabor
Notary

Notary Qualification Expires: 3/30/2003

[Stamp or Seal]

Robert N. Tabor
Notary Public, State of New York
No. 30-4738380
Qualified in Nassau County
Commission Expires March 30, 2003

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PROFESSIONAL EXPERIENCE

TELECOMMUNICATIONS CONSULTANT 1992-Present

- Expert witness before the FCC and State Public Utilities Commissions.
- Engineering witness on behalf of AT&T, MCI Worldcom, Covad Communications, Rhythms Links Inc., Bluestar, CLEC Coalition and Mid-Maine Telephone Company.
- Testified in 19 jurisdictions on behalf of clients.
- Provided consulting services for the design, project management and implementation of national DSL company.
- Provided consulting services to equipment staging, assembly and installation company.

NYNEX 1987-1992

- Between 1987 and 1992, I was the NYNEX Engineering Director-Long Island. In that position, I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers on Long Island, N.Y.

NYNEX 1985-1987

- Between 1985 and 1987, I was NYNEX District Manager-Midtown Manhattan. I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers in Midtown Manhattan.

NYNEX 1980-1985

- Between 1980 and 1985, I was NYNEX District Manager-Engineering Methods. In that capacity, I was responsible for the design, development, implementation and review of all outside plant methods and procedures for New York Telephone Company. Additionally, I was responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

AT & T 1978-1980

- Between 1978 and 1980, I was an AT&T District Manager, responsible for the design, development and documentation of various Bell System plans, and for audits and operational reviews of selected operating companies in matters of Outside Plant engineering, construction, assignment and repair strategy. I also served as the Project Team Leader at Bell Telephone Laboratories for the design and development of functional specifications for mechanized repair strategy systems.

NEW YORK TELEPHONE 1976-1978

- Between 1976 and 1978, I was District Manager-Outside Plant Analysis Center for New York Telephone Company. I was responsible for the analysis of all outside plant maintenance reports and the design, development and implementation of related mechanized reporting, analytical and dispatching systems. I was also responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

VARIOUS

- Between 1962 and 1978, I held a variety of technical and engineering positions of increasing responsibility at New York Telephone and Bell Telephone Laboratories. During 1967 and 1969, I was on military leave of absence from New York Telephone while serving in the U.S. Navy.

EDUCATION

I hold a B.S. in Electrical Engineering from City College of New York, and have taken a variety of specialized courses in telecommunications since college.

RECENT TESTIMONY

State of Maryland	Docket No. 8731 Phase I, Case No. 8842 Case No. 8745, Case No. 8879
Commonwealth of Virginia	Case No. PUC 970005, PUC 990101
State of New Jersey	Docket No. TX95120631 TX98010010
State of Pennsylvania	Docket No. A310203F0002 et al, MFSIII Docket No. R-00005261
State of West Virginia	Case Nos. 96-1516-T-PC 96-1561-T-PC 96-1009-T-PC 96-1533-T-T
State of California	Case Nos. R.93-04-003 I. 93-04-002
State of Wisconsin	Docket Nos. 6720-MA-104 3258-MA-101
District of Columbia	Formal Case No. 962
State of Delaware	PSC Docket No. 96-324
State of Iowa	Docket No. RPU 96-9
State of Hawaii	PUC Docket No. 7702
FCC	File No.E98-05, Docket No.98-147,96-98
State of Illinois	Docket No. 99-0593, 00-0312, 00-0313 98-0396, Advice No. 7280
State of New York	Case No. 98-C-1357
State of Massachusetts	DTE 98-57 III
State of Ohio	Case No. 96-922TP-COI
State of Michigan	Case NO U-12465